Technical Report #13

Adaptive Management: Concepts and Applications to Plum Creek's Native Fish Habitat Conservation Plan

Overview

Adaptive management is a challenging blend of rigorous science and practical management designed to provide the basis for "learning by doing." Adaptive management is used in the Plum Creek Native Fish Habitat Conservation Plan (NFHCP) to address areas of uncertainty and risk. Adaptive management can be used to address “leaps of faith” in the NFHCP where there is dependence on theoretical models and adoption of untested conservation measures. The purpose of Technical Report #13 is to define adaptive management, describe potential research and monitoring projects for the NFHCP, and identify evaluation criteria for the projects. The array of candidate projects described in this report represent the opinions of the authors in consultation with outside experts. The final suite of projects selected for the NFHCP will be dependent upon further discussions with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service.

Key Points

To be effective, adaptive management projects must include three components:

1. Clear objectives and testable theories that relate back to plan components
2. Credible design and study methods
3. Plan for changing management direction in response to new information

Technical Report #13 describes 15 proposed adaptive management projects for the NFHCP. The projects differ in the level of complexity and certainty, but must meet certain selection criteria to be included in the NFHCP.

Supporting Technical Information

Two basic experimental designs have been employed in the development of NFHCP research and monitoring projects. The first is the **descriptive or observational approach**, when the primary interest is the current status of the population or environmental setting. This approach requires careful consideration of sample size, data collection and analysis. The second is the **causal-comparative or experimental approach** when the objective is to establish cause-effect relationships. This can be achieved with either a **Before-After-Control-Impact** design or **Analysis of Variance** design.

Project Complexity and Certainty

Adaptive management projects proposed for the NFHCP fall under three categories:

- Continuous improvement monitoring
- Experimental management
- Basic research projects

Six of the 15 proposed projects are considered **continuous improvement monitoring** (CIM) because they are low risk but high return investments, and the

data can be immediately used to adjust management activities. Many of these activities involve annual database updates and inspections. Examples of CIM projects include road condition inventories, NFHCP implementation monitoring, grazing lease monitoring and biological monitoring of bull trout redds.

Another six projects are considered **experimental management** with more rigorous scientific design because of the importance or complexity of the topic. Examples of experimental management projects include evaluation of the effectiveness of NFHCP mitigation measures in reducing instream fine sediment from roads, and maintaining maximum water temperatures close to background levels. Other projects described under this category include a project to examine the effectiveness of NFHCP riparian buffers in maintaining natural levels of in-channel large woody debris, and the success of riparian restoration projects. Long term projects are also proposed to expedite watershed analysis using riparian “superguilds” and grazing trend plots.

Three of the projects are **basic research**. These are topics that are more speculative in nature or require more investigation before substantive mitigation measures can be initiated. Projects described under this category include development of a technique to suppress brook trout, and evaluation of conifer thinning to accelerate riparian forest development. A third project is designed to validate the Forest Vegetation Simulation model and riparian forest growth and yield relationships.

Project Criteria

The 15 projects listed in Technical Report #13 are proposed for the NFHCP. Several criteria will help Plum Creek and FWS to determine which adaptive management projects will be chosen for implementation To be selected, the project must do the following:

- Improve the level of "certainty" in mitigation measures
- Address the "Four C's" of cold, clean, complex, and connected water
- Be cost-effective
- Relate to a major item in the NFHCP that entails large costs or significant uncertainly
- Be credibly investigated with appropriate technology and design

The goal of these economic and technical criteria is to get the most return for native fish from the research and monitoring investment.

Conclusion and Implications

By the nature of the HCP process, a dynamic tension exists between the need to change management based on valid new information and the "No Surprises" policy that limits landowner liability for committing more land and money beyond the HCP requirements. Adaptive management is funded by the HCP applicant, in this case Plum Creek, to develop effective management strategies that achieve the objectives of the HCP.

The ultimate result of this process is a better understanding of ecosystem function and management based on scientific fact.